

REMARKS

The Examiner rejected claims 13-19 under 35 U.S.C. §112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner alleged that "[i]n claims 13, 17 and 18, it is unclear and confusing to what is meant by "adapted for"." In response, Applicants have amended claim 13 to clarify the invention.

In a telephone conversation on 04/13/2004 between the Examiner (Alexander Williams) and Applicants representative (Jack P. Friedman), the Examiner agreed that the amendment herein of claim 13 overcomes the 35 U.S.C. §112, second paragraph rejection of claims 13-19, and the Examiner further agreed to enter the amendment herein of claim 13.

The Examiner rejected claims 13-19 under 35 U.S.C. §103(a) as allegedly being unpatentable over Hall et al. (U.S. Patent No. 5,184,768) in view of Sakemi et al. (U.S. Patent #5,489,750).

Applicants respectfully traverse the §103(a) rejection.

35 U.S.C. §103(a)

Applicants respectfully contend that claim 13 is not unpatentable over Hall in view of Sakemi, because Hall in view of Sakemi does not teach or suggest each and every feature of claim 13. For example, Hall in view of Sakemi does not teach or suggest the Feature "wherein **the contact arranged on the substrate is substantially quadrilateral in shape**, wherein said substrate contact is adapted for x-ray through said electronic package to illuminate said solder ball and said contact, so that a bad joint shows in said x-rays as a round image of said solder ball and a good joint, in which said solder ball flows into said substantially quadrilateral shape, shows in said x-rays as a quadrilateral image" (emphasis added).

The Examiner admits: "Hall et al. fail to explicitly show a substrate contact arranged on the substrate by means of a second joining medium and wherein the contact arranged on the substrate is substantially quadrilateral in shape and has at least one transverse dimension greater than a diameter of said solder ball; in which said substrate contact is adapted for X-ray inspection by directing X-Rays through said electronic package to illuminate said solder ball and said contact, so that a bad joint shows in said x-rays as a round image of said solder ball and a good joint, in which said solder ball flows into said substantially quadrilateral shape, shows in said X-rays as a quadrilateral image."

The Examiner argues: "Sakemi et al. is cited for showing an electronic part with bumps on a circuit board. Specifically, Sakemi et al. (figures 7a to 16) specifically figures 7a and 7c discloses and a substrate contact 6 arranged on the substrate 20 by means of a second joining medium 4 and wherein the contact arranged on the substrate is substantially quadrilateral in shape and has at least one transverse dimension greater than a diameter of said solder ball; in

which said substrate contact is adapted for X-ray inspection by directing X-Rays through said electronic package to illuminate said solder ball and said contact, so that a bad joint shows in said x-rays as a round image of said solder ball and a good joint, in which said solder ball flows into said substantially quadrilateral shape, shows in said X-rays as a quadrilateral image **for the purpose of accurately determining the bonding quality in the appearance inspection between a substrate and device**" (emphasis added).

In response to the preceding argument by the Examiner, Applicants respectfully contend that Hall's invention, as disclosed by Hall, accurately determines the bonding quality in the appearance inspection between a substrate and device. Indeed, Hall discloses:

"Note that the cross-sectional profile of a properly wetted solder joint 38 is significantly different from the cross-sectional profile of an improperly formed solder joint 39. The proper solder joint 38 is wet to the substrate solder pad 32, and also to the substrate solder pad extension 34. By inspecting the solder joints using x-ray equipment, the configuration of a properly wet solder joint 38 in FIG. 3B can be seen to be significantly different than the improperly formed solder joint 39. The proper solder joint 38 possesses a shape or profile containing the portion extending beyond the circular solder joint perimeter. An improper solder joint 39 shows only a circular profile and does not contain the portion extending beyond the perimeter".

See Hall, col. 4, lines 32-45. In fact, the preceding quote from Hall is the essence of Hall's invention (see Hall, col. 2, line 58 - col. 3, line 2; Abstract).

Therefore, since Hall's invention already accurately determines the bonding quality in the appearance inspection between a substrate and device, and since Hall's disclosure of a novel

method of determining the bonding quality in the appearance inspection between a substrate and device is the essence of Hall's invention, Applicants respectfully contend that the Examiner's argument for modifying Hall with the teaching of Sakemi is not persuasive.

Based on the preceding arguments, Applicants respectfully maintain that claim 13 is not unpatentable over Hall in view of Sakemi, and that claim 13 is in condition for allowance. Since claims 14-19 depend from claim 13, Applicants contend that claims 14-19 are likewise in condition for allowance.

CONCLUSION

Based on the preceding arguments, Applicants respectfully believe that all pending claims and the entire application meet the acceptance criteria for allowance and therefore request favorable action. If the Examiner believes that anything further would be helpful to place the application in better condition for allowance, Applicants invites the Examiner to contact Applicants' representative at the telephone number listed below.

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